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AUTHOR Randhawa, Bikkar S.; And Others
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ABSTRACT

This study investigated the process of perceptual exploration and organization of children as a function of age and sex in two experiments. In Experiment I, 3- to 5-year-old children named the pictures of nine familiar objects arranged in 3 x 3 matrices (exploration tasks) and indicated preference for objects represented in pairs (pair-completion tasks). A measure of sequential organization was obtained. Responses were categorized into six patterns of exploration: nonsystematic, right to left, left to right, complex pattern, top to bottom, and bottom to top. Results indicated systematic developmental trends. Analysis of variance revealed that the tendency to use sequential organization increased with age and that this effect was dependent upon sex. In Experiment II, 5- to 8-year-old children named the pictures of nine objects and 25 objects arranged in square matrices and constructed arrays in a 4 x 4 grid. The added construction task eliminated the verbal and linear aspects of the exploration task. Results of the exploration task in Experiment II supported the earlier findings. In the construction task, developmental increases with age were not found. On both kinds of tasks, the children tended to organize the matrix in the left to right pattern even when no organized pattern was required for task completion. A cognitive explanation of these findings was preferred over a psychomotor explanation. (Author/RH)

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Developmental Perceptual Exploration and Organization

Bikkar S. Randhawa

University of Saskatchewan

Richard D. Herring, Kathleen Kollasch, and Robert Molek

University of Iowa

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Developmental Perceptual Exploration and Organization

Abstract

The present study investigated the process of perceptual exploration and organization of children as a function of age and sex in two experiments. In Experiment 1, 3 to 5 year old children named the pictures of nine familiar objects arranged in 3 x 3 matrices. In Experiment 2, 5 to 8 year old children named the pictures of nine and 25 objects arranged in square matrices. They also put 16 pictures in a 4 x 4 grid. The protocols were scored for a measure of organization and for six patterns of exploration. Systematic and differential developmental trends emerged for boys and girls.

Theoretical formulations in developmental perception suggest that exploratory behavior proceeds from a global and unsystematic to a more specific and systematic pattern, especially for visual and haptic tasks (e.g., Pick & Pick, 1970; Piaget, 1956). In a series of related articles, Elkind and his associates concluded that the manner in which a child visually explores an array is dependent jointly on the level of perceptual development and on the pattern of the stimulus configuration. (Elkind & Weiss, 1967; Elkind, Koegler, & Go, 1964; Elkind & Scott, 1962). The behavior elicited by these tasks is referred to as perceptual exploration.

In an attempt to explore further these findings, Kugelmass and Liebllich (1970) conducted a study using similar stimulus arrays. However, their study differed in several ways from the Elkind and Weiss study. First, they employed Israeli subjects. Second, they observed adults and children of ages 4 to 9 years whereas Elkind and Weiss studied only 5 to 8 year old children. Third, Elkind and Weiss reported results on each age group separately whereas Kugelmass and Liebllich reported their results for three categories: 4-6 year, 7-9 year, and adult. In spite of these differences, the findings of Kugelmass and Liebllich supported the conclusion of Elkind and his associates.

Both sets of authors proposed a psychomotor hypothesis as an explanation for the visual exploration patterns they observed. According to this hypothesis "patterns of visual exploration can be regarded as motor skills, such as standing and walking, which are acquired as a result of maturation and practice" (Elkind & Weiss, 1967, p. 559). However, an alternative hypotheses is that these patterns are determined by cognitive skills, which

are modified and elaborated by maturation and practice.

Children of these ages are learning to read, and a linear and sequential pattern of scanning, or "reading order" is required for this ability. If they are capable of conducting complex patterns of perceptual exploration, and are being trained in reading tasks, one reasonable hypothesis is that a linear, sequential pattern will become a more frequent strategy as the age of subjects increases. The use of a reading order might be elicited by a spontaneous exercise of this pattern by the resemblance of the task and materials to reading tasks and materials, or by the adoption of a reading order as an effective strategy for identifying all objects without omission.

The development of the reading order strategy may differ between the sexes. Performance on reading and verbal tasks is significantly higher for girls than boys at these ages (Maccoby & Jacklin, 1974; Anastasi, 1949). Therefore, an age by sex interaction may be expected where the measure is frequency of linear and sequential exploratory behavior. Experiment 1 was designed to investigate such effects.

Subject preference for familiar objects/pictures used as stimuli may be a factor in determining patterns of visual exploration, and it has not been investigated in previous studies. A cognitive explanation would be favored if the role of preference is significant. The present study examined this factor as a possible explanation for exploratory behavior.

Experiment 1

Subjects. From a roster of eligible children, eight boys and eight

girls of age 3, 4, and 5 respectively were selected. However, due to absenteeism, two 3-year old boys, and one girl from the 5-year group were not available at the time of testing. The cell frequencies are given in Table 1.

Materials. The experiment involved two different sets of nine pictures. The nine pictures included in set A were cut out from a children's dictionary and reproduced in color in four randomly chosen 3 x 3 arrangements. Similarly, the set B pictures were taken from a prereading primer and reproduced in four arrangements. Each of the eight resulting stimuli was printed as an 8 inch square containing nine pictures in a 3 x 3 matrix on a white background. Each 8 inch square was centered and mounted on a 9 inch square board. In addition, individual 4 inch square pictures of each set were reproduced and mounted on 4.5 inch square black mounting board. A complete schedule of 36 pair comparisons was prepared for the pictures within each set A and B respectively.

Procedure. About a week before the experimental sessions the experimenters spent a half day playing with the children and also had those children qualified for the study name the objects depicted in the two individual sets of pictures. The children selected for the study were all able to name the objects.

Each child was tested on two days within a two-week period. The experimental sessions lasted between 15-30 minutes. On day 1, half of the children of each age group were tested with set A materials and the other half with set B materials. Half of the children performed the pair comparison task first followed by the exploration task and the other half

of each group did the exploration task first followed by pair-comparison task. On day 2 the testing procedure was reversed.

In the exploration task the experimenter handed a matrix to the child and said, "I would like you to tell me what you see by slowly naming the objects one by one." The experimenter recorded the order of objects named and kept an audiotape record for verification.

In the pair-comparison task, the child was shown one pair of pictures at a time. Throughout the task the other pictures were hidden so that only the tested pairs were in view. The experimenter held one picture in each hand and presented them directly facing the child. The child was seated across a children's table on a small chair at a distance of approximately 2 feet. The child was asked to indicate the one he liked better.

Scoring. a) Exploration Tasks. Each child's protocols were first examined for errors of omission (failure to name a picture) and commission (naming the same picture twice). A measure of sequential organization was obtained for each protocol according to the procedure of Gottschall, Bryden, and Rabinovitch (1964). This measure was obtained by comparing the position of each successive response with the location of the previous one. One point was assigned to each pair of responses if they were either vertically or horizontally adjacent, or at the end and beginning of two adjacent rows or columns. The highest possible score on each protocol was thus eight and for all eight protocols it was 64.

In addition, the sequence of responses for each protocol was scored following Elkind and Weiss (1967) as closely as possible. This categorized the responses into six patterns of exploration, as follows:

1. Nonsystematic (NS): scored if at least three of the pictures named were not spatially adjacent, with no apparent pattern of directionality in overall performance.

2. Right to left (RL): scored if the child began at right side of card, named objects from right to left, and repeated this pattern for pictures lower or higher in the card.

3. Left to right (LR): scored as in RL when the direction of naming was from left to right.

4. Complex pattern (CP): scored if the child employed some combination of the previous three patterns or any other systematic pattern between protocols.

5. Top to bottom (TB): scored if the child began at the upper right or left corner of the card and named all the pictures in that column and then repeated this pattern for successive columns.

6. Bottom to top (BT): scored as in TB when the child began at a lower corner of the card.

b) Pair-Comparison Tasks. For each individual and for each of the two tasks a matrix of preferences was obtained consisting of ones (if a stimulus X was preferred over stimulus Y) and zeroes (if a stimulus X was not preferred over stimulus Y). Then, the total frequency of preferences of each stimulus over the others in each set was obtained.

Results

The results of the patterns of exploration are summarized and

presented in Table 1. These results indicate, as expected, systematic developmental trends. Specifically, both errors and NS responses, when combined over sex, decrease with increasing age. When boys and girls are

Insert Table 1 about here.

analyzed separately, only girls show gradual decrease in errors with age. Boys' errors and NS responses decrease at age 5 but are essentially the same at ages 3 and 4. Girls' NS responses decrease between ages 3 and 4 and seem to show no further decrease at age 5. The LR response emerges at age 4 for both boys and girls and this response shows differential increase at age 5. That age and sex interact in the development of LR response was indicated by the 2 x 2 contingency test ($\chi^2(1)=13.98$, $p<.0005$) and further corroborated by the significant sex difference only at age 4 ($\chi^2(1)=28.82$, $p<.0001$).

The RL response appeared in girls at age 3 and increased at age 4 but disappeared at age 5. In boys, this RL response appeared only at age 4.

The pattern of CP responses suggest an interactive relation between sex and age ($\chi^2(2)=6.19$, $p<.044$); boys' responses systematically decrease with age and girls' responses increase from 18.8% at age 3 to 26.6% at age 4 and then decrease to 10.7% at age 5.

In order to get at a parametric measure of the reading habit of the children, rank order correlation between the reported order of pictures on a card and the reading order of that card was computed. The average of eight such coefficients for each child was used as a representative measure.

As shown in Table 1, a significant reading trend emerged in girls at age 4 and increased at age 5. The boys showed significant reading patterns at age 5 only. Only one girl of age 4 reported consistently all the pictures in the reading order whereas three boys and three girls reported such at age 5.

The weighted totals of the averages of the measures of sequential organization from the two sets for each subject were analyzed in a 2 x 3 ANOVA. The significant age effect [$F(2,39)=8.64, p<.0008$] and the sex x age interaction [$F(2,39)=3.68, p<.0343$] indicated that the tendency to use sequential organization increased with age and that this effect was dependent upon sex. The means of the weighted totals of these measures of organization were 12.07, 13.72, and 14.72 for children of age 3, 4, and 5 respectively. The interaction between Sex and Age, as illustrated in Figure 1, indicated that girls show a dramatic increase in organizational ability between 3 and 4 whereas boys show this development about a year later.

Insert Figure 1 about here.

The reported order of stimuli in each protocol for each subject was correlated with the frequency of preferences of the corresponding stimuli. The overall average rank order correlation was -0.07, which indicated that children's preferences do not play any role in visual exploration.

Discussion

The age and sex analyses reported in the present study shed further

light on the visual exploration of young children. As postulated, the use of a linear, sequential pattern increased with subject's age, and there was a sex by age interaction. These results do not clearly support the conception of Elkind and Weiss (1967), that such patterns are related to the child's stage in learning to read. However, their notion has received more incisive support from the demonstration of the predicted RL directionality, and the increase in complex patterns of response in older subjects from Israel (Kugelmass and Lieblich, 1970).

Kugelmass and Lieblich's discussion (1970) suggests that the shift from BT to TB responses in their data provide further evidence of a psychomotor explanation of responses, and Elkind and Weiss (1967) reported an increase of TB responses which is consistent with that view. Our study, on the other hand, produced no TB responses and only a few BT responses; it lends no support to the psychomotor hypothesis. A cognitive interpretation would be favored if subject preference for objects was related to patterns of exploration; however, results indicate that object preference plays no role in the completion of these tasks.

Use of a complex pattern was observed in the youngest children and is stronger than RL or LR directionality, a finding consistent with Kugelmass and Lieblich (1970). The emergence of RL directionality and complex patterns in 3 year old subjects, and observed differences due to sex, suggest a possible explanation for the phenomena under study. Firstly, differences in cognitive maturity may well account for the differential development of perceptual organization and thus for the observed patterns of exploratory behavior in young boys and girls. Secondly, the development

of perceptual organization may not be the direct result of reading habit practice, but it may be the natural tendency of subjects to organize the environment in which they live. The emergence of CP, LR or RL tendencies in children even before exposure to formal schooling suggests the developmental attempt to organize the perceptual world.

It is not clear whether the description task itself affected responses. This task requires verbal responses, and uses a structural array which may resemble reading materials. Also, the task requirements may have favored the use of a reading order strategy to insure that all items are reported. Then, too, the data concerned only children through age 5. Further study of the phenomenon with variable tasks, variable task demands, and with school-age children might offer additional insight into this phenomenon. This was the objective of experiment 2.

Experiment 2

In order to eliminate the verbal and linear aspects of the descriptive exploration task, a new task was designed. In designing the task it was determined that the subject would not need to verbally identify the item. Also, the task would not require the subject to select an organized pattern to insure completion of the task. This was accomplished by changing the task to the construction of a matrix by placing a fixed number of photographs on a board. Therefore, when the subject would complete the task, all of the pictures would be used. Since a new population was to be used, it was determined necessary to replicate the description exploration task in order to compare the responses between the two populations, and also to

contrast the results of both types of tasks. However, in order to expand on the limited number of selection pattern variations it was decided to use a set of 5 x 5 arrays as well as a 3 x 3 array.

The ages of the subjects began at five years old to replicate the study in experiment one. The subjects' ages ranged up to eight years old in order to consider the response "novelty" tendency as discussed by Elkind and Weiss (1967), where it was suggested that subjects at ages of about seven or eight begin to use more of the complex patterns because they are exploring more interesting and novel patterns after having mastered the LR pattern.

Subjects. Eight boys and eight girls of ages 5, 6, 7, and 8 years were selected from a public school in Iowa City, Iowa. At the time of the experimental sessions one boy of age 8 was not available.

Materials. Materials used in this experiment consisted of two each of 3 x 3 and 5 x 5 square matrices of pictures and two 4 x 4 matrix construction tasks.

The pictures for the 3 x 3 and the 5 x 5 matrices were from the same sources and mounted in the same fashion as the ones used in Experiment 1. However, the pictures for Experiment 2 were reproduced in black and white only.

The pictures for the 5 x 5 matrix ~~construction~~ task were cut out and arranged in five straight rows with five pictures in each row. They were then photographed in black and white, printed on 11 inch square sheets and mounted on 12 inch square black mounting boards. The construction task materials consisted of two grey mounting boards, 10 inches square, marked

with black lines into 16 squares, each about $2 \frac{5}{16}$ inches square with a small margin around the outside edges of the board. Two sets of 16 individual black and white photographs of common household objects were prepared and mounted on $2 \frac{1}{4}$ inch square boards. One of the sets consisted of items that might be included in a breakfast food and table setting, while the other consisted of pictures of miscellaneous household objects.

Procedure. Four boys and four girls of each age group were given description tasks first followed by the construction tasks and four boys and four girls were given construction tasks first followed by the description tasks. The description tasks were administered and recorded exactly as in Experiment 1.

In the construction task, mounting board placement was varied as another factor. Half the subjects of each sex had the board placed directly in front of them, and the pictures were scattered on the table by the edge of the board farthest from the subject. The other half of subjects had the pictures scattered directly in front of them, and the board placed beyond the pictures. These positions were reversed on the second trial for each subject. The subjects were given the following instructions:

"Here are some pictures and a board. First turn all the pictures so you can see them all. Look at the pictures carefully for a minute and then put them in the squares on the board in any way you like." The subjects were given one minute to look at the pictures before they were allowed to put them on the board. After a subject had put the pictures

on the board he was asked if he wanted to rearrange them in any way. The experimenter recorded the serial order of the placement of specific pictures on the board.

Scoring. Both the descriptions and the reconstructions were scored to determine the extent of sequential organization and the patterns of exploration as described in Experiment 1.

Results

Results of the patterns of exploration on various tasks are provided in Table 2. On the LR pattern of responses a general increase with age was observed for 3 x 3 and 5 x 5 description tasks. This increase was a continuation of the trend for 3 x 3 arrays which developed in the three to five year olds in the first study. A similarity of results for five year olds in both 3 x 3 description task studies is also apparent. The 5 x 5 description task at age five also reflected a marked similarity to the 3 x 3 results for both experiment 1 and 2.

However, in the 4 x 4 construction tasks, although the LR pattern at age five combined over both sexes began with a similar level as in the description task, the developmental increase with age never materialized. Instead, the level seemed to hold close to fifty percent for LR responses. In contrast to the developmental LR trend in the description task, the combined nonsystematic responses in the construction task maintained a level near 23% and the combined complex patterns hover near 18%.

The developmental patterns of LR responses for the description tasks and construction tasks for all subjects are illustrated in Figure 2. These

graphs represent the responses for each sex on each task. Clearly on both related and unrelated 4 x 4 construction tasks, girls' LR pattern was higher than boys ($\chi^2(4)=81.34$, $p<.0001$ and $\chi^2(4)=58.28$, $p<.0001$ respectively). However, though the boys were not using the LR patterns as significantly as the girls, they were not using NS patterns either. Instead, they were using other organized patterns, including a combination of RL, CP and TB at higher levels than the girls. However, by the age of seven, boys begin to decrease their use of organized patterns other than LR. At age eight, the difference between the boys' lower number of LR patterns and the girls' higher number of LR patterns is due to the boys' increased use of NS patterns.

Generally, with both related and unrelated tasks the children show a propensity to organize the matrix in the LR pattern than any other pattern. This is particularly true of the girls. The boys, however, used systematic patterns other than LR at age five and more NS patterns by age eight. This evidence is further corroborated with the rank order correlation measures for the various groups shown in Table 2. No significant effects were obtained for the measures of sequential organization using the scoring method of Gottschalk, Bryden, and Rabinovitch (1964).

Discussion

It should be noted first that the trend toward LR patterns continued for the 3 x 3 arrays through both studies and that the five year olds in the two studies performed at almost identical levels for each pattern. This confirms the appropriateness of considering the second sample as a

reasonable extension of the first. Also, since the 3 x 3 and 5 x 5 results in the second study are almost identical, it appears that the increased size of the array had no effect on the outcome for the exploration task.

The finding that exploration tasks were performed more systematically than the construction tasks suggests that structural properties and the task demands do influence the patterns of exploration employed by children. Of particular importance are the differences and the similarities between the tasks in the studies. The exploration task involved verbalizing the visual array. The results suggest that the exploration task may encourage the use of the LR pattern (a pattern already shown to be heavily followed by both sexes at age five) in order to assure that all items from the array are mentioned with no deletions. However, since the construction task does not require verbalization or the need to remember which items have not been used, it would appear the change in task may not favor the LR pattern, or any other systematic pattern for that matter. It must be recognized, at the same time, that the board used for the construction task did have squares outlined in a 4 x 4 grid, which would allow for the linear CP pattern for those who would be inclined to use it. Further experiments are necessary to study the effects of verbalization, task completion factors, and materials designed as specific determinants of subject responses.

There was a significant difference between the tasks, but this difference is reflected primarily in the males' behavior. In contrast to the "novelty" hypothesis in Elkind's study, there was not an increase in CP patterns at higher ages in either the exploration task or the construction

task. Girls tend to develop the use of LR patterns earlier than boys, and they persevere in the use of the LR pattern even in the construction task when a systematic strategy is not required to insure completion of the task. However, the boys, even at age five, make significantly less use of LR patterns in the construction task, even though they followed near the girls in pattern responses for the exploration task. The boys at age five did use some LR patterns, but used a greater number of other systematic patterns. However, by age eight boys used non-systematic responses more frequently than any other.

These results show that girls persevere in the LR pattern even when no organized pattern is necessary to complete the task. Boys' patterns are more variable, and shift with task demands. The evidence does not suggest that boys are less capable of employing systematic patterns. Between the ages of five and eight, they demonstrate almost exclusive use of LR patterns in exploration tasks, and exhibit complex patterns as early as age three.

It is proposed instead that boys are more able to differentiate between tasks and assess task demands more accurately than girls. When confronted with a task requiring no systematic patterns to aid completion, boys tend to use systematic patterns less often. The data also suggest that the ability to assess tasks increases with boys' ages. In the construction tasks, they show a developmental trend from the use of systematic patterns to nonsystematic patterns, and this may demonstrate an increasing awareness that no completion rule is necessary.

Three explanations may be offered to account for the LR perseverance

in girls. First, girls show LR patterns at a younger age than boys, and their additional practice may strengthen the tendency to employ this pattern. Second, girls demonstrate better reading abilities at these ages than boys, and their use of this pattern may reflect a greater ability to apply it to diverse materials. Third, girls' persistence in the use of the LR pattern may be reflective of research which indicates that girls' activities and attitudes in play behavior, adherence to social standards, and motor behaviors are more restrained than those of their male counterparts (Anastasi, 1949). The girls' LR patterns could therefore be an example of rigidity in behaviors that is reinforced by cultural norms. Generally, more recent findings (Maccoby, 1974) seem to be less conclusive about such socialization factors. However, even in these findings there appears to be some possibility that boys' field independence and set-breaking behaviors may be superior specifically in the area of visual-spatial tasks. Sex differences in these behavioral abilities may be the cause for the girls' persistent use and the boys' independence from LR patterns in our experimental tasks.

In reference to the cognitive versus the psychomotor hypothesis, we believe our results tend to support a cognitive explanation. This is due to the boys' apparent developmental tendency to assess task demand and change response strategies accordingly. Also, Elkind and Weiss found evidence for a psychomotor hypothesis by finding novel patterns. Our failure to replicate this finding further weakens support for this hypothesis.

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TABLE 1

Percentages of responses for the Seven Patterns of Exploration and

Average Rank Correlation Coefficients (r) of the Protocols with the Reading Order

Age Level	Sex	N	NS	RL	LR	CP	TB	BT	Errors	r
3	M	6	58.3	-	-	41.7	-	-	45.8	-.13
3	F	8	76.6	3.1	-	18.8	-	1.5	40.6	.11
3	Combined	14	68.8	1.8	-	28.6	-	0.8	42.9	.01
4	M	8	59.4	1.5	6.3	32.8	-	-	45.3	-.11
4	F	8	18.7	15.6	39.1	26.6	-	-	14.1	.53*
4	Combined	16	39.1	8.5	22.7	29.7	-	-	29.7	.21
5	M	8	25.0	-	60.9	6.3	-	7.8	7.8	.51*
5	F	7	19.6	-	69.6	10.7	-	-	7.1	.69*
5	Combined	15	22.5	-	65.0	8.3	-	4.2	7.5	.59*

* Significant at the .01 level.

TABLE 2

Percentages of Responses for the Six Patterns of Exploration and Average Rank Correlation Coefficients (r) of the Protocols with the Reading Order for the Various Stimulus Arrays

Array	Age Level	Sex	N	NS	RL	LR	CP	TB	BT	r
3x3	5	M	8	18.8	6.2	62.5	12.5	-	-	0.64
	5	F	8	18.8	-	75.0	6.2	-	-	0.97
	5	Combined	16	18.8	3.1	68.8	9.3	-	-	0.80
	6	M	8	12.5	-	87.5	-	-	-	.94
	6	F	8	25.0	-	75.0	-	-	-	0.80
	6	Combined	16	18.8	-	81.2	-	-	-	0.87
	7	M	8	-	-	93.8	-	6.2	-	0.97
	7	F	8	-	-	100.0	-	-	-	0.89
	7	Combined	16	-	-	96.9	-	3.1	-	0.93
	8	M	7	-	-	100.0	-	-	-	1.00
	8	F	8	-	-	100.0	-	-	-	1.00
	8	Combined	15	-	-	100.0	-	-	-	1.00
5x5	5	M	8	25.0	-	62.5	12.5	-	-	0.44
	5	F	8	12.5	-	87.5	-	-	-	0.98
	5	Combined	16	18.8	-	75.0	6.2	-	-	0.71
	6	M	8	12.5	-	87.5	-	-	-	0.86
	6	F	8	6.2	-	81.3	12.5	-	-	0.98
	6	Combined	16	9.4	-	84.4	6.2	-	-	0.92
	7	M	8	-	-	100.0	-	-	-	1.00
	7	F	8	-	-	87.5	12.5	-	-	0.77
	7	Combined	16	-	-	93.7	6.2	-	-	0.88
	8	M	7	-	-	100.0	-	-	-	1.00
	8	F	8	-	-	87.5	12.5	-	-	0.99
	8	Combined	15	-	-	93.3	6.7	-	-	0.99
U - 4x4	5	M	8	-	2.5	37.5	37.5	-	-	0.02 ^a
	5	F	8	-	-	100.0	-	-	-	0.75
	5	Combined	16	-	12.5	68.8	18.7	-	-	
	6	M	8	37.5	12.5	25.0	25.0	-	-	0.47
	6	F	8	25.0	-	62.5	12.5	-	-	0.59
	6	Combined	16	31.2	6.3	43.7	18.8	-	-	
	7	M	8	25.0	12.5	25.0	37.5	-	-	0.18
	7	F	8	25.0	-	62.5	12.5	-	-	0.76
	7	Combined	16	25.0	6.3	43.7	25.0	-	-	
	8	M	7	71.4	-	28.6	-	-	-	0.49
	8	F	8	12.5	-	75.0	12.5	-	-	0.99
	8	Combined	15	40.0	-	53.3	6.7	-	-	
R - 4x4	5	M	8	25.0	12.5	25.0	37.5	-	-	
	5	F	8	12.5	12.5	75.0	-	-	-	
	5	Combined	16	18.8	12.5	50.0	18.7	-	-	
	6	M	8	12.5	-	37.5	37.5	12.5	-	
	6	F	8	37.5	-	62.5	-	-	-	
	6	Combined	16	25.0	-	50.0	18.7	6.2	-	
	7	M	8	37.5	-	37.5	25.0	-	-	
	7	F	8	12.5	12.5	62.5	12.5	-	-	
	7	Combined	16	25.0	6.2	50.0	18.8	-	-	
	8	M	7	42.8	-	28.6	14.3	14.3	-	
	8	F	8	-	-	75.0	25.0	-	-	
	8	Combined	15	20.0	-	53.3	20.0	6.7	-	

^aThe correlation coefficients of the related and unrelated 4x4 protocols are combined for this table.

Figure Captions

Figure 1. Mean organization scores of boys and girls by age.

Figure 2. Percentages of LR responses on the four tasks by sex.



